

Decimal Multiplication

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CONCEPT

1

Decimal Multiplication

Here you'll learn how to figure out where to put the decimal point in a product when you multiply decimals.

Have you ever seen a dinosaur exhibit?



When the students in Mrs. Andersen's class arrive at the Science Museum, Kara is very excited to learn that there is a dinosaur exhibit. In fact, it is a famous dinosaur exhibit. A set of dinosaur bones from a triceratops has been reconstructed and is on display. Kara can't wait to get to see it. She has a feeling that this is going to be her favorite part of the museum. Several other students are equally excited, so Mrs. Andersen and the chaperones decide to go to the exhibit first and then split up into groups. When Kara walks in, she is delighted. There before her eyes is a huge skeleton of a triceratops. After visiting the exhibit for a while, the students begin to move on. Mrs. Andersen sees Kara hesitate before leaving the exhibit. She walks over to her.

"Imagine, that dinosaur is about 4 and a half times as long as you are!" Mrs. Andersen smiles. The students exit the exhibit hall, but Kara pauses at the door. She has to think about this. In all of her excitement she forgot to find the information that actually says how long the triceratops actually is. Mrs. Andersen's words stay with her, "*the dinosaur is $4\frac{1}{2}$ times as long as you are.*" Kara knows that she is $5\frac{1}{4}$ feet tall. If the dinosaur is $4\frac{1}{2}$ times as long as she is, how long is the dinosaur? While Mrs. Andersen and the chaperones start to split up the students, Kara begins working some quick math on the back of her museum map.

She writes down the following figures.

$$5.25 \times 4.5 = \underline{\hspace{2cm}}$$

If Kara multiplies these numbers correctly, she will be able to figure out how long the triceratops is.

How long is he?

In this Concept you will learn all about multiplying decimals. When finished, you will know the length of the triceratops.

Guidance

Sometimes, you will want to multiply two decimals without using a hundreds grid. You will want to use a method that is more efficient.

How can we multiply two decimals without using a hundreds grid?

One of the ways that we can do it is to work on it just like we did when we multiplied decimals and whole numbers together.

First, we ignored the decimal point and multiplied just like it was two whole numbers that we were multiplying.

Second, we counted our decimal places and inserted the decimal into the *product* when we had finished multiplying.

We can approach two decimal multiplication in the same way.

$$1.3 \times .24 = \underline{\hspace{2cm}}$$

To work on this problem, let's start by writing it *vertically* instead of *horizontally*. Then we multiply.

Take a look at this problem.

$$\begin{array}{r} 1.3 \\ \times .24 \\ \hline 52 \\ + 260 \\ \hline 312 \end{array}$$

Now that we have finished the other steps, our final step is to put the decimal point in the correct spot. To do this, we need to count the decimal places in each number from right to left. The first number has one decimal place.

$$\underline{1.3}$$

The second number has two decimal places.

$$\underline{.24}$$

This is a total of three decimal places that need to be placed into the product.

Our final answer is .312.

How can we confirm our answer by using estimation?

When we multiply two decimals, sometimes we can use estimation to check our work.

$$4.7 \times 2.1 = \underline{\hspace{2cm}}$$

We can start by rounding each decimal to the nearest whole number.

4.7 rounds to 5.

2.1 rounds to 2.

Next, we multiply $5 \times 2 = 10$.

Our answer is around 10.

Now let's figure out our actual answer and see if our estimate is reasonable.

$$\begin{array}{r} 4.7 \\ \times 2.1 \\ \hline 47 \\ + 940 \\ \hline 9.87 \end{array}$$

Our answer is 9.87.

We can see that our estimate is reasonable because 9.87 is very close to 10.

Now it is your turn. Multiply the following decimals.

Example A

$$3.1 \times 4.9 = \underline{\hspace{2cm}}$$

Solution: 15.19

Example B

$$1.2 \times 5.1 = \underline{\hspace{2cm}}$$

Solution: 6.12

Example C

$$3.2 \times 6.7 = \underline{\hspace{2cm}}$$

Solution: 21.44

Now that you have learned all about multiplying decimals, let's help Kara figure out the height of the triceratops. Here is the problem once again.

When the students in Mrs. Andersen's class arrive at the Science Museum, Kara is very excited to learn that there is a dinosaur exhibit. In fact, it is a famous dinosaur exhibit. A set of dinosaur bones from a triceratops has been reconstructed and is on display. Kara can't wait to get to see it. She has a feeling that this is going to be her favorite part of the museum. Several other students are equally excited, so Mrs. Andersen and the chaperones decide to go to the exhibit first and then split up into groups. When Kara walks in she is delighted. There before her eyes is a huge skeleton of a triceratops. After visiting the exhibit for a while, the students begin to move on. Mrs. Andersen sees Kara hesitate before leaving the exhibit. She walks over to her. "Imagine, that dinosaur is about 4 and a half times as long as you are!" Mrs. Andersen smiles.

The students exit the exhibit hall, but Kara pauses at the door. She has to think about this. In all of her excitement she forgot to find the information that actually says how tall the triceratops actually is.

Mrs. Andersen's words stay with her, "*the dinosaur is $4\frac{1}{2}$ times as long as you are.*"

Kara knows that she is $5\frac{1}{4}$ feet tall. If the dinosaur is $4\frac{1}{2}$ times as long as she is, how long is the dinosaur?

While Mrs. Andersen and the chaperones start to split up the students, Kara begins working some quick math on the back of her museum map.

She writes down the following figures.

$$5.25 \times 4.5 = \underline{\hspace{2cm}}$$

Let's work on figuring out the height of the triceratops.

First, let's estimate the product.

5.25 rounds down to 5.

4.5 rounds up to 5.

5×5 is 25 feet tall.

The triceratops is approximately 25 feet long.

Now let's figure out its actual height.

$$\begin{array}{r}
 5.25 \\
 \times 4.5 \\
 \hline
 2625 \\
 + 21000 \\
 \hline
 23625
 \end{array}$$

Next, we add in the decimal point.

The triceratops is 23.6 feet long. He is a little longer than 23 and one-half feet.

Wow! That is one big dinosaur!!

Vocabulary

Here are the vocabulary words found in this Concept.

Hundreds grid a grid of one hundred boxes used to show hundredths when working with decimals.

Product the answer in a multiplication problem.

Vertically written up and down in columns

Horizontally written across

Guided Practice

Here is one for you to try on your own.

$$134 \times .567 = \underline{\hspace{2cm}}$$

Answer

This problem is going to have several steps to it because we are multiplying decimals that are in the thousandths place. That is alright though. We can do the same thing that we did with larger decimals. We can multiply the numbers as if they were whole numbers and then insert the decimal point at the end into the final product.

Let's start by rewriting the problem vertically instead of horizontally.

$$\begin{array}{r}
 .134 \\
 \times .567 \\
 \hline
 938 \\
 8040 \\
 + 67000 \\
 \hline
 75978
 \end{array}$$

Wow! There are a lot of digits in that number-now we need to put the decimal point into the product. There are three decimal places in the first number .134. There are three decimal places in the second number .567.

We need to count six decimal places from right to left in the product.



*How can
that be?*

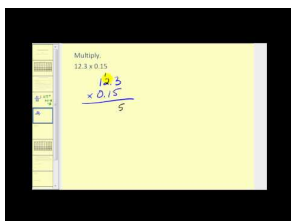
When this happens, we can add a zero in front of the digits to create the sixth place.

.075978

Our final answer is **.075978**.

Video Review

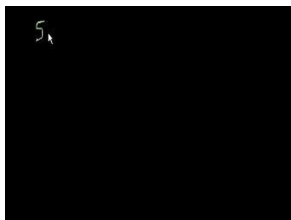
Here are videos for review.



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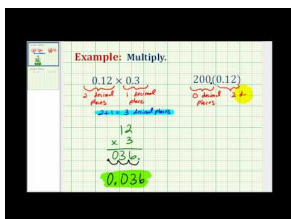
James Sousa Multiplying Decimals



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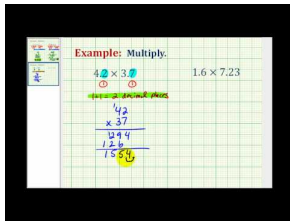
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James Sousa Example of Multiplying Decimals



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James Sousa Another Example of Multiplying Decimals

PracticeDirections: Multiply the following decimals.

1. $4.3 \times .12 =$ _____
2. $2.3 \times 3.4 =$ _____
3. $.34 \times .56 =$ _____
4. $2.7 \times 3.2 =$ _____
5. $6.5 \times 2.7 =$ _____
6. $.23 \times .56 =$ _____
7. $1.23 \times .4 =$ _____
8. $.5 \times .76 =$ _____
9. $.23 \times .8 =$ _____
10. $3.45 \times 1.23 =$ _____
11. $1.45 \times .23 =$ _____
12. $.89 \times .9 =$ _____
13. $.245 \times .8 =$ _____
14. $34.5 \times .7 =$ _____
15. $18.7 \times .9 =$ _____
16. $22.3 \times .76 =$ _____
17. $21.7 \times .4 =$ _____
18. $14.5 \times .68 =$ _____
19. $20.1 \times .3 =$ _____
20. $34.23 \times .18 =$ _____
21. $.189 \times .9 =$ _____
22. $.341 \times .123 =$ _____
23. $.451 \times .12 =$ _____
24. $.768 \times .123 =$ _____
25. $.76 \times .899 =$ _____